



The  
**Imperial Forestry Institute**  
University of Oxford

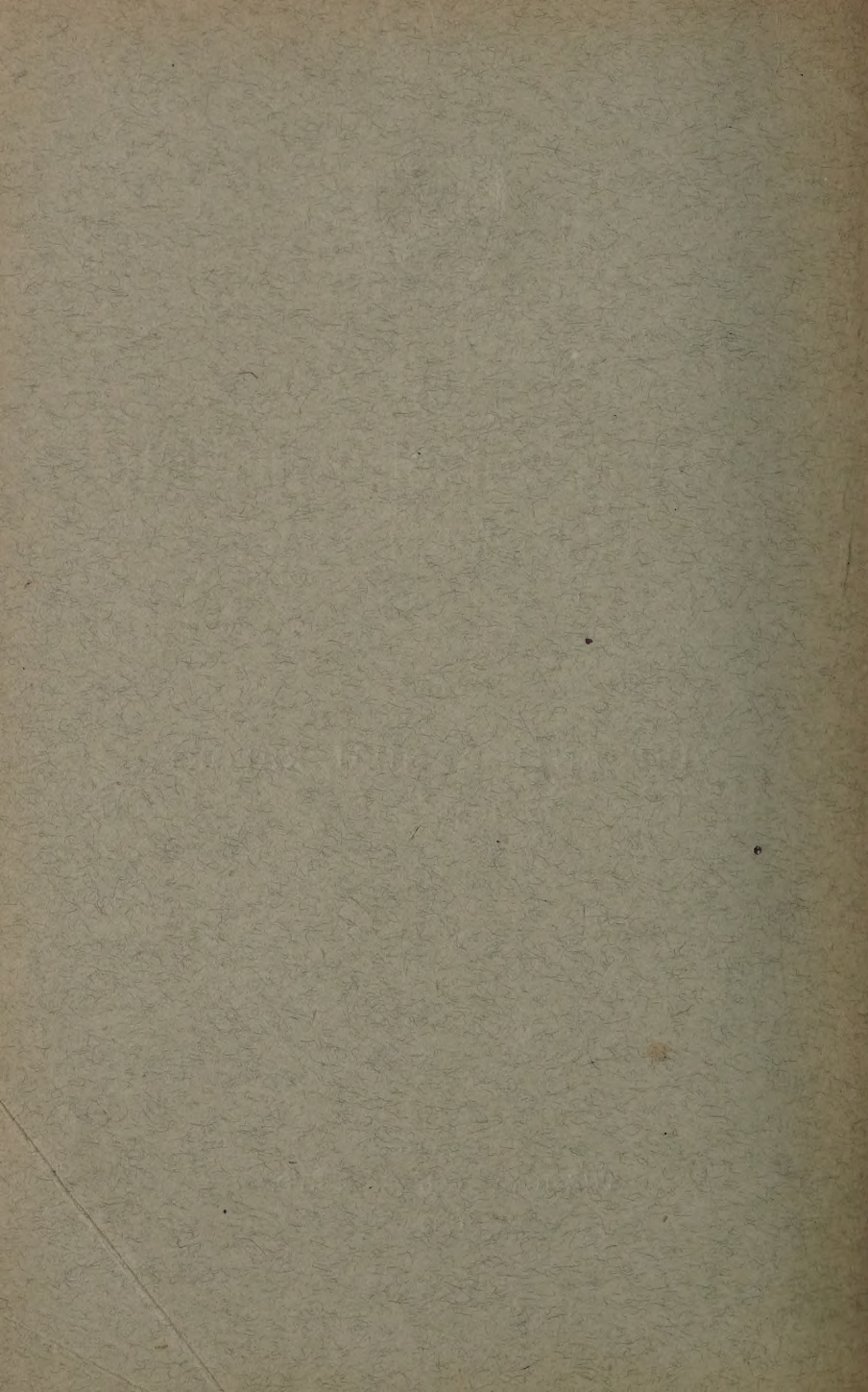
FIFTEENTH ANNUAL REPORT

1938—39



Oxford  
THE HOLYWELL PRESS, LTD.

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COMMITTEE FOR THE IMPERIAL FORESTRY  
INSTITUTE

1938-39

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## OBITUARY

### PROFESSOR R. S. TROUP.

Robert Scott Troup, F.C.H., M.A., D.Sc., F.R.S., C.I.E., C.M.G., Professor of Forestry at Oxford and the original organiser and for twelve years Director of the Imperial Forestry Institute, died on October 1st, 1939, at the age of 64. Forestry, both in Britain and the Empire, has suffered a great loss by his death, and his counsel and guidance will be greatly missed in the Department of Forestry at this time of change and re-organization.

Troup began his long career in forestry in 1894 when, following a competitive examination, he entered the Royal Indian Engineering College at Coopers Hill as a probationer for the Indian Forest Service. His previous education had been at the Gymnasium, Grammar School and University of Aberdeen. He was very successful during his three years' training at Coopers Hill, was easily top of his year and was awarded a fellowship. Like many other foresters of his time, an important part of his training consisted in a period of service under an experienced European forester; in his case this was spent mainly in the Harz Mountains. He showed during this time the common-sense and capacity for unassuming hard work, and the reliability and steadiness at games, which were to be his marked characteristics throughout life. His principal recreations were music and boxing and, later, skating, at which he became very expert. His musical talent became finally centred in the bagpipes.

His Indian service began in Burma, where he stayed a relatively short period. He demonstrated, however, his ability to bear responsibility and to see what was essential in forest administration. The latter was shown, for example, by the stress he laid on regeneration and in the introduction, for the first time in a Burma working plan, of a stock map. While still a junior officer he was posted to the charge of Tharrawaddy Forest Division (the present Tharrawaddy and Zigon Divisions), then the heaviest and still the show division of Burma.

In 1906 he left Burma to become Forest Economist at the Forest Research Institute and College at Dehra Dun and from then onwards his career was mainly concerned with administration, research and education. He later held the posts of Superintendent of Working Plans and Silviculturist at Dehra Dun, and finally became Assistant Inspector General of Forests to the Government of India in 1915. On the formation of the

Indian Munitions Board in 1917 he was made Controller of Timber Supplies and held this post until February 1918. His career in India closed when, in 1920, and still a comparatively young man, he was elected to the Chair of Forestry at Oxford in succession to Sir William Schlich. In leaving India Troup relinquished the certainty of early selection for the post of Inspector-General of Forests.

Troup was set a difficult, but at the same time inspiring, task in succeeding Sir William Schlich, who was the last of the great German foresters who laid the foundations of scientific forestry in India and was, moreover, a great figure throughout the forestry world and a very capable teacher. The time was one of particular importance in forestry education in Britain. There was a shortage of forest officers owing to the cessation of recruiting during the Great War, and it was necessary to train men quickly for service without first ensuring that they had received that thorough training in science and in field experience of forestry practice, which had previously been considered essential, especially for officers of the Indian Forest Service. It fell to Troup, therefore, to see that, under these difficult conditions, the Oxford forester was sufficiently grounded in the fundamental principles as well as in the technical practice of forestry, and in this he succeeded to an extraordinary degree. There was, however, a growing realization, which he largely helped to develop, that the facilities in the Empire for forestry education were inadequate, and in 1924, as the result of his recommendations to the Empire Forestry Conferences of 1920 and 1923, and to the Interdepartmental Committee on Imperial Forestry Education, the Imperial Forestry Institute was founded at Oxford and he was appointed the first Director. He thus became responsible for the training of post-graduate forestry probationers, and of research officers, as well as for the provision of 'refresher courses' for forest officers already serving. Research work carried out by the staff was also under his direction.

The appointment to direct and organize the Institute was a recognition of his high status in forestry education, research and administration. There was probably no one at the time by whom he could adequately have been replaced. Very few, if any, however, then realized the immense amount of work and responsibility which the dual office involved, and the period during which he combined the posts of Professor and Director was the most strenuous and difficult of his career. In 1936 it was realized that some measure of relief was necessary, and he relinquished the post of Director although remaining in administrative charge of the Department. Shortly after this took place his health gave way and he had to undergo a serious operation. His recovery seemed rapid and satisfactory, but his renewed



health did not last long. With characteristic courage and tenacity he continued at his work, often to the point of exhaustion, knowing the important and difficult time through which the Department was passing. At the time of his death he was engaged on the final section of his book, now in the press, on 'Colonial Forest Administration.'

Troup's writings were numerous and covered a wide field in Forestry. He was a careful and accurate observer and had an unusual talent for the compilation, clear statement and exposition of data. These qualities are well shown in his books. His better-known works are the monumental 'Silviculture of Indian Trees' (1921) and 'Silvicultural Systems' (1928), and his latest publication, 'Forestry and State Control' (1938). A work of considerable value which has not received the attention it deserves is 'Exotic Forest Trees of the British Empire' (1932). His very considerable knowledge of ecology is exemplified, not only by his silvicultural works but also by his contribution, 'Problems of Forest Ecology in India,' to 'Aims and Methods in the Study of Vegetation,' edited by A. G. Tansley and T. F. Chipp (1936). The books and papers he published while in India were largely written for educational purposes and show how well his experience there fitted him to be a teacher and leader in forestry education.

All who came into intimate contact with Troup will remember him with pleasure and esteem. His colleagues as well as students will especially value his memory, for he gave of his knowledge freely and with modesty and always was easily approached. He was always willing to give advice to his colleagues on the staff of the Institute, but he had the faculty, all too rare in heads of Departments, of encouraging research and yet recognizing that to be effective the researcher should be left free to carry out his work without interference.

Forestry, which is often looked upon by the general administration as a Cinderella, had in him a faithful and distinguished protagonist. His lectures on forestry in the Colonial Administrative Service Course were one of the first attempts to ensure that administrative officers of the colonies should understand the functions and importance of forestry in their territories. His loss will be greatly felt not only by his family but by foresters throughout the Empire.

# UNIVERSITY OF OXFORD

## FIFTEENTH ANNUAL REPORT OF THE IMPERIAL FORESTRY INSTITUTE ACADEMIC YEAR, 1938-39

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### INTRODUCTION.

The major interests during the year under review have been provided by the change in function and constitution of the Institute which took place at its close. The nature of this change and the reason for it were discussed at length in the Introduction to last year's report. It affected forestry at Oxford in three important ways. First, the School of Forestry has been merged with the Institute which, thus reconstituted, has the status of a University Department, with the Professor of Forestry at its head. Second, this fusion has involved certain changes in staff. Thus, on completion of his period of appointment as Director, Mr. J. N. Oliphant has left the Institute to become Chief Conservator of Forests in Nigeria, and the post of Director is amalgamated with the Professorship.

Mr. Oliphant came to the Institute at the beginning of a period of difficult changes and readjustments and financial stringency, and faced the tasks before him with courage and unremitting energy. Amongst other measures he was responsible for the inception of the News Bulletin of Empire Forest Departments which has had a rapidly widening circulation, and for the informal annual meetings of Colonial Forest Service Officers on leave in the summer, as well as the system of lectures by visiting officers, all of which have done much to promote the exchange of views and information amongst serving Forest Officers from all parts of the Empire, and to keep the Institute abreast of the latest developments and trends of thought. With the same object he sought every opportunity for arranging visits by members of the Institute staff, or officers attending refresher courses, to Forest Departments overseas. The benefits of his careful management of the Institute's limited financial resources throughout his term of office are being felt in the present emergency. In the preparation of plans for reorganisation and the new arrangements for the study of Forestry as a post-graduate subject, and for the training of Colonial Forest Service Probationers, he gave valuable co-operation. His services to Colonial Forestry were recognized in 1939 by the award of a C.M.G.



Certain transfers of staff have also been made in pursuance of the policy of the University to concentrate the work of all branches of any one subject in the Department which is specially concerned with it; the teaching of Forest Entomology is, thus, now carried out by the Hope Department and that of Systematic Forest Botany by the Botany Department. Dr. R. N. Chrystal, the Entomologist, and Mr. A. C. Hoyle, who is in charge of the Herbarium, together with their assistant staffs, have, accordingly, been transferred to these Departments and the financial responsibility for them has been taken by the University as part of its contribution to Forestry. The teaching of these subjects to Foresters will in no way be endangered; on the contrary, it is anticipated that in their new environment the staffs concerned will find increased stimulation and support.

Another change in the staff has been necessitated by the establishment of the Imperial Forestry Bureau. This was foreshadowed in the previous year's report and actually took place in October 1938. The Documentation section, the forerunner of the Bureau, then ceased to exist. In June, Mr. J. W. B. Sisam took up his duties as Deputy-Director of the Bureau, and this very welcome new institution in Empire Forestry is now well established. Mr. P. S. Spokes, who was Documentation Officer at the Institute until the Bureau was established, now forms the link between the two institutions.

The third matter which has been of importance during the year, owing to the change in constitution, has been the revision of the curriculum. This revision is necessary under the new conditions partly because of the much more adequate training in fundamental science which forestry students at Oxford will receive in future and partly to meet the needs of the Colonial Service Forestry Scholars who have to do a probationary term of service in between the first and second years of their forestry education. In order to prevent overlapping there will be no students studying under the new curriculum until the year 1940-41.

Institute papers continue as a means of bringing out papers which cannot be placed conveniently in any of the journals owing to length, subject matter or urgency. This year's papers have appeared in printed form, to the great enhancement of their appearance and value. The Current Monthly Record has been taken over by the Bureau and has now merged in Forestry Abstracts. The News Bulletin is now being edited by Mr. Sisam. It continues to prosper and now appears in printed form. It has greatly enlarged its circulation during the year. There has been an increase in its size and in the number of contributors. Among other publications we are glad to record the appearance of a Check-List for Ceylon and a fourth volume of Forest Trees and Timbers.

Dr. Burt Davy retired at the end of his term of reappointment for a period of four years in 1935, when he had already reached the normal retiring age. He came to the Institute shortly after its foundation in 1924 as head of the Botany Section, and his period of office has been distinguished by generous service and fruitful achievement. Under his guidance the Section has been able to satisfy, to a marked extent, the need of forest officers for help in taxonomy, in the identification of tree species and in the ecological classification of forest vegetation, the necessity for which arose during the last two decades, owing to the increasing exploitation and development of the forest resources of the tropical colonies and of the greater realization of the need for care in agricultural land utilization. The building up of the Herbarium has been one of his outstanding achievements. While his main activities have been concerned with tropical forests, the needs of British forestry were never forgotten. The researches of himself, and of other members of his Section, on willows, poplars and elms, illustrate this. Upon the outbreak of war, with characteristic generosity, he offered his services without stipend to carry on necessary work in Systematic Forest Botany and, with an unavoidably depleted staff, these have been gratefully accepted.

The year closed under cloud, partly because of the foreboding of war, only too soon to be realized, and partly because of the severe illness of Professor Troup during the last few months of the year, to be followed in October by his death. The loss of the Professor at this time of internal reorganization and external stress owing to war, is felt very keenly. When he was taken ill Mr. W. R. Day was appointed Deputy-Professor, and so continues, while Dr. L. Chalk became Acting Director of the Imperial Forestry Bureau on the departure of Mr. Oliphant at the end of the year.

### GENERAL.

Owing to the new system under which Colonial Forest Service probationers are sent direct to their colonies after graduation, none were received for training during the year.

Attendance by forest officers and others for refresher or special courses was as follows :—

#### *Colonial Service, Dominion and Indian Forest Officers.*

Australia	-	-	-	-	1
Dehra Dun	-	-	-	-	1
Gold Coast	-	-	-	-	2
Malaya	-	-	-	-	1
Nigeria	-	-	-	-	1
Northern Rhodesia	-	-	-	-	2
Southern Rhodesia	-	-	-	-	1

<i>Private Students.</i>					
China	-	-	-	-	1
Germany	-	-	-	-	1
Tanganyika	-	-	-	-	1
Total					—
					12
					—

This total is the same as last year, and compares with an average of nine for the six years ending 1937-38.

No tour on the Continent was undertaken during the year, but several students taking special courses accompanied the School of Forestry tours, while others undertook specially arranged tours.

The customary excursions to study soils with Mr. Clarke, of the Soil Science Laboratory, and utilization with Mr. Lloyd were made during the Trinity Term.

Lectures given by visiting officers and others are shown in chronological order in the following list:—

Dr. A. Grasovsky, Senior Forest Officer, Colonial Forest Service, Palestine (two lectures) :

‘ Impressions on Forestry in Cyprus.’

‘ The History, Archeology, and Soil Erosion of Palestine.’

Mr. F. E. Hughes, Colonial Forest Service, Gold Coast :

‘ The problem of forest reservation in the Gold Coast.’

Mr. Sven Petrini, Secrétaire Général, International Union of Forest Research Organizations, Sweden (two lectures) :

‘ The calculation of the soil value in forestry.’

‘ The calculation of the rotation for a forest stand.’

Dr. P. W. Richards, School of Botany, Cambridge (three lectures) :

‘ The primary and secondary rain forest of south-western Nigeria.’

‘ The rain forest of British Guiana.’

‘ The rain forest of Borneo.’

The fourth informal meeting of Colonial Forest Service Officers on leave was held in June and attended by representatives from the Gold Coast, Kenya, Malaya, Nigeria, and Northern Rhodesia. Mr. W. D. Muir, of the New South Wales Forest Service, and Mr. W. G. Trapnell, of the Ecological Survey, Northern Rhodesia, attended as visitors. There was an interesting discussion on the effect of vegetation on climate. In this Mr. W. G. Kendrew, Lecturer in Climatology, and Mr. C. G. T. Morison, Reader in Soil Science, gave valuable help. There was general agreement as to the necessity for the making of carefully-directed observations in connection with this sub-



ject. The great interest taken in the discussion may be regarded as an indication of the growing realization of the importance of a knowledge of eco-climates in relation to the development and utilization of forests.

### SPECIAL STUDENTS.

Dr. Yao Tang, Professor of Forest Products at the National South-eastern University and Head of the Forest Products Laboratory at Chungking, China, spent some months at the Institute. Though primarily interested in research on wood, he also made a study of the organization of the Institute for teaching and research and made many micro-photographs of literature in the library.

Herr Eberhard Schmidt, who is in charge of the wood structure section of the Institut für ausländische und koloniale Forstwirtschaft at Tharandt, Germany, spent four months studying wood anatomy with Dr. Chalk. In addition to the general technique of wood description he was specially interested in systematic anatomy and made an extensive study of the slide collection for this purpose.

### BOTANY SECTION.

Dr. Burt Davy completed his period of office as head of the Section with the close of the year and retired on the following September 30th. The year has been a time of great activity within the Section. It has also been marked by a reduction of the number of junior assistant staff for reasons of financial stringency. In particular, the transference of Mr. P. G. Peak, a trained assistant on the junior staff, to the Imperial Forestry Bureau adversely affected the progress of work. The effect of staff shortage was made less acute through an arrangement by which it has been possible to employ Dr. Hora on the preparation of the Tanganyika Check-list as part of his work for Dr. Burt Davy in connection with the vegetation and flora of Tropical Africa. Dr. Hora has been paid out of a personal grant made by the Pilgrim Trust to Dr. Burt Davy for the furtherance of this work. Dr. Burt Davy also permitted Dr. Hora to be in charge of the Herbarium during Mr. Hoyle's absence in the Sudan. Dr. Burt Davy was also responsible for the remuneration of Dr. H. H. Bancroft, who for most of the year continued to work on Dendrological Notes. Reduction of staff has made it necessary to discontinue Dendrological Notes. Dr. Bancroft was also responsible for the identification of British Elms for the Forest Products Research Laboratory, and a Monograph of the African species of Dipterocarpaceae.

Mr. Hoyle was seconded to accompany Mr. C. G. T. Morison to the Southern Sudan during the Christmas Vacation and Hilary

Term, in order to correlate the flora and vegetation with the particular soils under investigation. An extensive collection was made, representative of the flora of the areas from which Mr. Morison obtained his soil samples, and connected with the ecological work carried out by their colleague, Mr. Hope Simpson. After Mr. Morison's return, Mr. Hoyle and Mr. Hope Simpson visited certain areas of rain-forest towards the extreme south of the Southern Sudan: in these areas a number of interesting and useful timber trees were recognized as belonging to the West African flora, with which Mr. Hoyle has become familiar from herbarium material. The tour has been of great use in familiarizing him with the vegetation and forest flora of that region, and particularly by enabling him to study the individual variation of species as they occur in the field. Among other objectives he was able to make a careful study and extensive collection of species of *Acacia* which, it is hoped, will clear up the confusion existing as to the specific limits and geographical distribution of certain species, particularly of *Acacia seyal* and *A. stenocarpa*.

Dr. Burt Davy lectured on Tropical Systematic Botany during Michaelmas and Hilary Terms, and on Tropical Forest Ecology during Trinity Term. Two Burma probationers took the former course and one Colonial Service and one Indian forest officer the latter. Five other forest officers and the ecologist to the Northern Rhodesian Department of Agriculture also worked for varying periods in the herbarium. While, in the future, the teaching of Tropical Systematic Botany will be carried out by Mr. Hoyle, as Demonstrator in the Department of Botany, the teaching of Tropical Forest Ecology, which should be given a definite silvicultural bias, will continue to be carried out in the Forestry Department, at least for the coming year. This has been made possible under the present war conditions through Dr. Burt Davy offering to delay his retirement and to continue as Demonstrator in Tropical Ecology free of stipend for the ensuing twelve months.

Herbarium accessions and exchanges for the year are recorded in Appendices V and VI.

A temporary laboratory assistant was employed for six months; this allowed a certain amount of mounting and 'laying in' of specimens to be done, but only 1,425 specimens were so treated during the year. There is a large amount of valuable material which is quite inaccessible for reference or study until it has been mounted and filed; much of this comprises species not yet represented in the mounted herbarium. It will be necessary, for some time to come, to reduce the amount of routine identifications to a minimum in order that this material may be rendered accessible at the earliest opportunity.

In accordance with the new Forestry Statute, the Forestry Herbarium of some 55,000 sheets, built up by Dr. Burt Davy at the Institute, has been transferred to the Department of Botany as from August 1st, 1939.

Inasmuch as there is not room at the Department of Botany to accommodate the Tropical Forest Herbarium and its staff, they must continue to occupy their present rooms at the School of Forestry until adequate and suitable quarters can be found for them, and the teaching of Tropical Systematic Botany must continue to be carried on in the same building.

Owing to the absence of Mr. Hoyle, only one member of the staff, Mr. H. L. Dunkley, has been regularly engaged on identifications for the Colonies, the Forest Products Research Laboratory and the Forestry Commission; the number of identifications has therefore fallen heavily, as indicated in Appendix IV.

The correction of the nomenclature of the 'British Standard Nomenclature of Hardwoods' was carried through during the year on behalf of the British Standards Institution through the Forest Products Research Laboratory. This is an important piece of work which occupied much time and thought.

Our knowledge of the forest flora of the tropical British Colonies has vastly improved during the past ten years, owing largely to the work of the Imperial Forestry Institute in training Forest Officers in Systematic Botany, in identifying material collected, and in publishing information about it.

The First Draft Check-list of Trees and Shrubs of Ceylon was issued during the year, in multigraph form. Under the reorganization, no provision has yet been made for the completion of those Check-lists which are either ready for final editing or are in course of preparation; for the preparation of these lists the Colonies are dependent on the Institute, except in those few cases where there is a Systematist on the staff of the local Forestry Department. This is, therefore, one of the urgent future problems. Lists already compiled but requiring final revision include: (1) Gibraltar, Malta and Cyprus (with Aden); (2) Palestine; (3) Nigeria; (4) Gold Coast (additions and corrections to first draft have been received and should be compiled into a second edition); (5) Northern and Southern Rhodesia (to be united into one list); (6) Sierra Leone; (7) the Solomon Islands; and (8) Tanganyika Territory.

Tanganyika Territory is the area for which a Check-list is most urgently needed. It is a region of very diversified vegetation and flora, about which less is known botanically than of any other British Territory in Africa. The need for this particular Check-list has been emphasized by three local Government Departments (Tsetse Research Department, Forestry Department, and East African Agricultural Research Station), who have promised funds for its publication when completed.



The Director of the East African Agricultural Research Station at Amani is allowing Mr. Greenway to revise the First Draft issued by the Institute in the light of material in the Amani herbarium, correlated with his own field notes. During the past year Dr. Hora's time has been mainly devoted to work on this Check-list, the first part of which comprises a vernacular-botanical name index and a botanical-vernacular name index. After consultation with the Departments concerned it has been agreed that it would be best to get this published before attempting to complete the Annotated List which is being compiled from various sources; these latter include Mr. Greenway's notes already referred to and the late Mr. B. D. Burttt's voluminous field notes placed at our disposal for the purpose by the late Mr. Swynnerton.

As stated above this important work has been financed through a grant by the Pilgrim Trust made personally to Dr. Burttt Davy. It is not possible to continue this arrangement, but it is hoped to make adequate financial provision to complete the work.

Dr. Burttt Davy has offered to continue his work on the Forest Flora of Tropical Africa, and on the Vegetation of South Central Tropical Africa, after his retirement, provided that suitable accommodation for work is provided; this has been promised him.

Mr. Hoyle has continued his critical work on the difficult genus *Brachystegia*, aided by the extensive collections and field notes made — at our request — by forest officers working in the *Brachystegia* zone, and by the very full and valuable field notes made by the late Mr. B. D. Burttt who, at our suggestion, paid particular attention to field observations on the genus, not only in Tanganyika Territory, but also in Northern Rhodesia and Nyasaland, when he toured that region in connection with his Tsetse work. Mr. Hoyle has also been aided by the observations of Mr. Trapnell, Ecologist to the Agricultural Department of Northern Rhodesia. Great difficulty has been experienced in arriving at sound conclusions as to specific limits in this genus, in which the species appear to hybridize freely; it is a genus which appears to be in a state of flux. It is much to be desired that Mr. Hoyle may be able to continue this work under the Department of Botany.

Dr. Burttt Davy's work on the Forest Flora of Tropical Africa has, unfortunately, been constantly interfered with by the necessity of devoting much time to teaching and rendering assistance to forest officers home on leave.

A not inconsiderable amount of time has been spent in editing work submitted by forest officers for publication. This is valuable, but time-consuming work which has still further increased the difficulties of the Section with its depleted staff.

The Section is indebted to the Sherardian Professor of Botany, Oxford; the Director of the Royal Botanic Gardens, Kew; the Keeper of Botany, British Museum (Natural History), and many others, for valuable help and co-operation.

### WOOD STRUCTURE SECTION.

Dr. L. Chalk remained in charge of this section, with Dr. M. M. Chattaway as his assistant. Two foreign wood anatomists, one Colonial Forest Officer and one research botanist took advantage of the facilities offered by the section for special studies.

Work was begun on a new book on the vegetative anatomy of the dicotyledons, which is to be produced in conjunction with Dr. C. R. Metcalfe of the Royal Botanic Gardens, Kew. The book is intended to summarize and review all the known facts about the anatomy of the vegetative organs of dicotyledons that are thought to be of value for taxonomic or diagnostic purposes. In a sense it will be supplementary to Solereder's 'Systematic Anatomy of the Dicotyledons,' as it is not intended to include references to original articles published before 1908, but at the same time it will contain the essence of the original Solereder in a condensed form, together with much new subject matter and fresh features, which will give the book the status of an entirely new work. The sections concerned with the anatomy of wood will be prepared at Oxford and will include data that have been accumulated over a number of years but not published. So far Dr. Chattaway has completed the preliminary descriptions of the wood anatomy of twenty-four families.

Research into the technique of describing and identifying woods was continued. The work done on these lines in previous years is proving of very great value for the project described above. Early in the year it was decided to make use of the perforated card system for recording characters of woods, and all the data collected by Dr. Chattaway in America and a large proportion of those previously collected at the Institute have been recorded in this form. It is hoped eventually to keep all the records of wood studied in this form.

Dr. Chalk completed and published his study of the distribution of vessel diameters and ray widths in the dicotyledons. This work later formed the basis of a list of standard terms of size and of definitions adopted by the International Association of Wood Anatomists.

Dr. Chalk continued to hold the post of Secretary-Treasurer of the International Association of Wood Anatomists.

The number of identifications made during the year was 108 specimens. Two hundred and ninety specimens were added

to the type collection, which now totals 12,885, and slides were prepared of 80 woods. Distributions in exchange amounted to 389 woods and 120 slides.

### FOREST PATHOLOGY SECTION.

Mr. W. R. Day continued in charge of the Section, assisted by Mr. T. R. Peace. The use of the laboratory assistants, Messrs. F. H. Jones and P. A. Town, on field work, under the supervision of the senior staff, has continued.

The yearly survey of Elm Disease was made. The disease in general showed a reduction in the number of trees affected, and in the severity of attack on the individual trees. This reduction was more noticeable in the east and midlands than in the west of England. The fungus and Elm Bark Beetles were found by workers of the United States Department of Agriculture in a log near Jedburgh in Roxburgh. There was, however, no sign of the disease on living elms in the neighbourhood. This is the first record of the fungus in Scotland. It is hoped to find resistant elms suitable for fresh planting by testing plants propagated from large trees which have survived inoculation without showing signs of disease. Propagation from six such trees, which survived inoculation with the fungus unharmed in 1938, is now in progress. In order to confirm the resistance of these trees to disease, four were re-inoculated in the summer of 1939. In addition twenty-three mature trees, selected because they were still apparently unattacked, although situated in areas where the disease was severe, were inoculated for the first time. Seventeen of these show promise of resistance. Thanks are due to the owners of these trees for permission to inoculate them. Propagation is also proceeding from a number of resistant strains selected from mixed elm seedlings. Sincere thanks are due to the United States Department of Agriculture, and especially to Dr. J. M. Walter and Mr. D. E. Parker of that Department, for their co-operation in Elm Disease work during the past three years. It is a great loss that their work in Great Britain has now been discontinued.

The dying of 70-year-old Douglas Fir in the New Forest has been found in one case to be due to lightning injury, possibly assisted by the fungus *Phomopsis pseudotsugae*, and in another to unsuitable soil conditions with *Adelopus gaumannii* as a possible contributory cause. The second case probably has an important general bearing on the reactions of older trees to certain difficult soils. Owing to a varying water-table the trees are unable to maintain a permanent root system, except in the poor and often very dry surface layers, and because of this are unable to survive difficult seasons without becoming diseased.



The fungus *Adelopus gaumannii*, which is causing so much damage in Switzerland and South Germany, has now been found in Devon, Somerset, North Wales and Roxburgh. There are no signs, as yet, that its effect will be as severe in this country as on the Continent. *Rhabdocline pseudotsugae*, the other important leaf-cast affecting Douglas Fir, is also being kept under observation. It is hoped that the study of variation in Douglas Fir initiated in America during the summer of 1938 may help to throw light on these disease problems.

Mr. P. A. Town continued the investigation into the cause of the forking of Ash. The data collected have not yet been analysed, but it seems probable that frost, the ash bud moth (*Prays curtisellus*), and an unexplained failure of certain buds to break, though they remain alive, are the three main causes of the over-frequent failure in development of the terminal buds of young Ash. It is thought that the third factor may be associated in some way with a maldistribution of growth-promoting substances in the twig. Thanks are due to the Entomology Section for aid with the insect side of this investigation.

Preliminary work on the widespread failure of young European Larch plantations is in progress. This is a complex problem in which a number of factors are involved, including frost, soil, and the Larch Canker fungus. Experiments on the frost resistance of Larch races were completed this year, but the results have not yet been analysed. Inoculations of European Larch with the Larch Canker fungus have also been carried out in co-operation with Dr. G. G. Hahn of the Division of Forest Pathology, United States Department of Agriculture, using a strain identified by him as *Dasyscypha willkommii*. A number of inoculations have caused definite die-back and necrosis of small twigs under conditions which preclude the possibility of any frost injury to the plants.

A number of diseases of Norway Spruce and Sitka are under observation. These are not widespread but are serious locally. In most cases the cause of disease has still to be diagnosed. A careful watch is being kept on these diseases because of the economic importance of Spruce in this country.

Numerous cases of the discolouration and defoliation of pine have been briefly investigated. This is a complex problem in which a number of factors such as frost, wind, difficult soil conditions, leaf-destroying fungi, and the physiological character of the tree are concerned. An adequate investigation of it is impossible at the present time.

The *Castanea mollissima* which remained to be tested for their susceptibility to *Phytophthora* root-rot were so severely injured by frost as to be worthless for experimental purposes. The results of the work on this problem have now been pub-

lished, and it is not intended to proceed any further with it except that a watch will be kept on the field plots of *Castanea crenata* to see whether this species is markedly resistant to root-rot under forest conditions in this country.

*Silvicultural Research.* The work this year, carried out by Mr. Day together with Mr. Sanzen-Baker, Forestry Commission Research Officer for England and Wales, has been concerned mainly with the afforestation of chalk downland. A preliminary report on this matter has been submitted to the Forestry Commission, and it is hoped in course of time to publish papers dealing with the problems which arise.

A short time was spent in the New Forest examining certain soils which belong or are related to those of the high ground-water class and in which problems of drainage are of great importance. It is hoped that time will be found for their further study.

Visits have also been made to certain areas in Central Wales where European Larch is failing. The silvicultural aspect of this problem is of considerable importance and it is hoped to find time to study it.

Field tests for deficiency diseases have continued. The work has been carried out by Mr. F. H. Jones. It has been demonstrated clearly that a chlorosis of Beech growing at Streatley in the Thames valley is due to a deficiency of iron. Probably much, if not all, of the chlorosis of Beech, so common on chalky soils, is due to this cause. Further field work is being carried out on the South Downs and in Cornwall.

*Miscellaneous.* Mr. F. H. Jones completed the experiments on frost lift and the results have been published. Certain soil coverings were, under the conditions of the experiment, greatly superior to all the others in preventing frost lift. Nursery experiments are necessary, however, before the general applicability of these coverings can be proved.

A preliminary survey has been made of the incidence of a serious root-rot of *Thuja plicata* in plantations in the Forest of Dean. *Thuja plicata* is known to be subject to the disease. The affected trees usually do not die, but the rot is sufficiently serious in some places to render early felling desirable. The evidence suggests that *Armillaria mellea* is the fungus mainly responsible.

Experiments on the control of damping off by treatment of the seed with chemical dusts before sowing are now in progress.

A testing ground for investigating the resistance of Poplars to bacterial canker and rust has been set up at Munford in Norfolk. This will be used particularly to test the resistance of new hybrid Poplars. Thanks are due to Dr. E. J. Schreiner of the United States, Dr. C. Heimburger of Canada, and Prof. G. Jacometti of Italy for sending cuttings of hybrid Poplars.

Tests are also being made as to the susceptibility to withering of the leaves of Sycamore, Beech, Oak, Ash and European Larch when sprayed with sea-water in various concentrations. This continues some work previously carried out on Pines in this connection.

Other problems under investigation include a canker of young Oak regeneration in the Forest of Dean, a canker of Sycamore in Yorkshire, and the abnormal growth of Corsican Pine in Suffolk.

Mr. Day continued to lecture on Forest Hygiene, as in previous years.

About fifty enquiries were dealt with during the year. Many of these could not be given the attention they deserved.

The entire staff of the section is now actively engaged in research projects, and yet certain major problems, notably the failure of European Larch and the defoliation of Pine, cannot be adequately dealt with.

## ENTOMOLOGICAL SECTION.

Dr. R. N. Chrystal, who is in charge of this section, was absent from Oxford for a period of six months, from September 1938 to March 1939, during which time he undertook a tour of Australia and New Zealand.

In his absence, Mr. J. M. B. Brown took over the teaching duties in the School of Forestry in addition to his ordinary duties. In the Michaelmas Term, Mr. F. G. Browne, a forest officer from Malaya, undertook a course at the Institute in Forest Entomology. This course was divided into five parts, and included: studies on statistical and experimental methods, classification studies on the Scolytid bark-beetles, studies on the morphology of Coleopterous larvae, studies on recent literature of a biological and morphological nature, and visits to the Entomological Section of the Forest Products Research Laboratory at Princes Risborough, Bucks.

The number of advisory enquiries received during the year reached approximately the same figure as last season. Two interesting items stand out: The discovery of the Tenebrionid beetle, *Nacerrdes melanura* L., in railway timber on the L.M.S. line at Rhyl, and a heavy infestation of the Larch longhorn beetle, *Tetropium gabrieli* Weise., on the estate of Lord Hastings at Melton Park, Norfolk. In this case the beetles were believed actually to have attacked and killed healthy trees. The very large numbers which were found when Mr. Brown first visited the area in February 1939 lent considerable colour to this theory. A later visit in June, however, when a more detailed examination of the trees was made, with the assistance of Mr. Peace, the Assistant Mycologist, showed that while the numbers of the



beetles had certainly been excessive owing to the long period they had had to breed up, the fundamental cause of the trouble was undoubtedly due to over-maturity of many of the trees, coupled with the presence of root fungus in many cases. The number of beetles was heavily reduced by prompt removal and barking of the worst infested trees during the spring.

The visit to Australia and New Zealand had unfortunately to be curtailed owing to unforeseen circumstances and the last part of the tour had to be abandoned. This necessitated a shortened stay both in New Zealand and Australia.

About four weeks were spent in Australia, and during that period visits were paid to Perth, Adelaide, Melbourne, Canberra and Sydney. The greater part of the time was spent in Victoria and New South Wales. Early in December a visit was paid to New Zealand. This lasted for about six weeks, most of the time being spent in a comprehensive tour of the South Island. A similar tour of the North Island had been arranged, but only a small part of this could be carried out. A detailed account of the tour will be prepared at a later date.

The research work has been in the charge of Mr. J. M. B. Brown. The principal investigation has been an ecological and biological study of the three 'chafer' (Lamellicorn) larvae, *Melolontha melolontha*, *Phyllopertha horticola* and *Serica brunnea*, which are the most important pests of forest nurseries. The feeding habits of the adults have now received a good deal of study in the field, and the life-cycles of all three have been accurately determined as far as this country is concerned. The facilities provided by Mr. Sanzen-Baker in the Forestry Commission nursery at Kennington have been fully used in this work.

Experiments in practical control work have been restricted to trials of a net for collecting the adults of *Phyllopertha* at Delamare, and to testing the value of naphthalene as a deterrent to egg-laying by *Melolontha* and *Phyllopertha*. The net was unsuccessful, but the naphthalene experiments are being persevered with during the present season. Other current experiments include: further tests of soil fumigants, the protection of seed beds against egg-laying by use of beetle-proof cover such as 'hessian,' and further investigations of the value of crop-rotation and bare fallowing. Exchange of ideas and material with the Farnham House Laboratory biological control scheme involving the use of the *Dexia* parasite of *Melolontha* is being continued.

A comprehensive report on the Pine Weevil experiments in the New Forest was prepared in the autumn. The results were unfavourable in so far as the efficacy of trapping before felling was concerned, but it should be pointed out that the size of the plots (3 acres), and the original density of the traps (27 per acre),

were small. With a larger unit of treatment, and more intensive trapping over one, or perhaps two seasons, prior to replanting, a different result might have been obtained. Two facts of considerable importance came to light during the course of last season's work. It was found that during the period April to mid-July, when freshly emerged adults dominate the collections, bundles of twigs were much more attractive than billets. Again, the assessment of weevil damage clearly showed that the weevils were attracted to areas where there was a dense crop of grass or other vegetation, the young crop suffering much more severely in such places than in open ground.

Observations made in the Forest of Dean in May 1939 showed that the winter moth (*C. brumata*) is, at present, the principal defoliator of Oak. *Hybernia defoliaria* is scarce, and *Tortrix viridana* is scarce, but shows signs of increasing.

### SILVICULTURE.

Professor Troup gave his course of lectures on Tropical Silviculture during the Trinity Term.

Mr. R. G. Sanzen-Baker remained attached to the Institute in his capacity of Research Officer for England and Wales, Forestry Commission. This post does not carry with it any teaching duties, but much of the research work is of value for instructional and demonstrational purposes.

The work of this branch can be divided into three categories, viz.: (i) nursery research, (ii) forest investigations and experiments, and (iii) sample plot work. Nursery experimental work is carried out principally at Kennington Nursery on the outskirts of Oxford, but also at a number of other research nurseries in different parts of the country. Other research and sample plots work is conducted in both privately-owned and Forestry Commission woodlands and plantations.

By kind permission of St. John's College, a new nursery was established in Bagley Wood, near Oxford, in order that studies might be made on the raising of planting stock in natural woodland soils as opposed to highly cultivated agricultural soils. Two smaller nurseries of a similar nature have also been made, one in Sussex, the other in South Wales.

The supervision of Bagley Wood, in an advisory capacity, has been undertaken by Mr. Sanzen-Baker's section by arrangement with St. John's College.

Nursery research work followed similar lines to those of previous years, and included such studies as: stratification of seed, time and density of sowing, and the use of seed bed covering materials such as crushed granite and sands of different colour and texture. Work continued on the use of various seed bed mediums — peats, humus, woodland soil and composts. A

special study is being made of the maintenance of nursery fertility, and further experiments were carried out on the vegetative propagation of both conifer and broad-leaved species and the use of growth hormones. Special attention is being paid to the raising of plants with suitably furnished roots from the mycorrhiza standpoint. Dr. M. C. Rayner, of the Bedford College for Women, is co-operating in this work.

Facilities were afforded at Kennington Nursery to Mr. J. M. B. Brown for his studies on the cockchafer problem, and to Mr. T. R. Peace for his pathological work. The nursery continues to attract many visitors both from this country and from overseas.

The investigation into the afforestation of exposed chalk downland continued in collaboration with Mr. W. R. Day, and a preliminary report was prepared having particular reference to the following State forests: Friston on the Sussex coast, Buriton on the Hampshire-Sussex border, and Brightstone in the Isle of Wight. Further experiments, including the use of special composts and beech plants from various nurseries, have been established in this connection, and it is likely that the investigation will continue for some time.

In furtherance of Dr. Rayner's work with organic composts and their application in the afforestation of poor *Calluna* moorland, composting was carried out on a large scale in the forest and a considerable number of experiments were laid down involving the sowing and planting of various species in conjunction with the use of the composts; also a large-scale Corsican pine sowing experiment was carried out for costing purposes. This work is giving very satisfactory results although, of course, it is a fairly costly method of afforestation.

Further studies of mixed plantations of pine and spruce on poor *Calluna* moorland were undertaken and reports prepared. During the last ten or twelve years a large number of forest experiments dealing with manurial treatments has been carried out, particularly on peat and poor *Calluna* moorland. A general survey of the whole position has been carried out and a large amount of data collected. There are so many complicating factors involved that a brief summary of results is not possible.

Special reports were prepared by Mr. Day and by Mr. Sanzen-Baker and other Forestry Commission officers on Hope Forest, Derbyshire, an exposed, high elevation forest in the Peak District. Afforestation here is proving particularly difficult owing to a number of causes among which are exposure, atmospheric pollution, and severe run-off of rainfall. As a result of these reports, experimental work was started; this included trials of planting methods and of Sitka spruce of various nursery origins. This is giving very interesting results. Root systems of the

plants used have been reported on by Dr. M. C. Rayner with particular reference to their structure and mycorrhiza.

A new line of experimental work was taken up. This concerns the treatment of insufficiently stocked and gappy plantations about twenty years old, by cutting out undesirable trees and underplanting with various species. Earlier experimental projects, for example, the establishment of hardwoods, were, of course, followed up, and several new experiments established.

Thirty forest sample plots were thinned and re-measured according to programme, and sixteen new permanent plots were laid down in Forestry Commission plantations in East Anglia.

During the year under review, Mr. Sanzen-Baker dealt with a number of enquiries both personal and written, and in certain cases visited the woodlands concerned. He held various informal discussions with Forest Officers from overseas who had occasion to visit the Institute, and he assisted in arranging tours when required. He arranged certain details of the annual excursion of the Society of Foresters of Great Britain which this year was held in the neighbourhood of Scarborough.

## SOIL SCIENCE.

Mr. G. R. Clarke delivered a course of lectures to probationers and refresher class students on the more general aspects of soil science. This course was supplemented by weekly excursions to places of interest in the neighbourhood to study the relationship of soil and vegetation.

Mr. C. G. T. Morison, University Reader in Soil Science, took an expedition to the S.W. Sudan to study the soil and vegetation of that region. The expedition, of which Mr. Hoyle was a member, left England at the beginning of December and returned in April, affording about three months' field work.

Many botanical specimens and soil samples were obtained and much valuable work was accomplished.

The results, which it is hoped to publish as soon as circumstances permit, throw much light on the soil-vegetation relationships in that part of the tropics.

The expedition was partly financed by the Sudan Government, and would not have been possible without the co-operation and help which was afforded to it by Government officials both in Khartoum and the provinces.

## FOREST ENGINEERING AND UTILIZATION.

Colonel A. H. Lloyd continued in charge of the Section. The usual practical course was given in field engineering, including bridge construction and the erection of a wire-rope-way, and



was attended by several forest officers on leave and also by probationers for the Colonial Administrative Service.

During the summer vacation an alignment and estimate was prepared for a forest tramway for timber extraction in Scotland, and an extraction-road scheme was also made for a forest estate in Westmorland.

Discussions and lectures on utilization and transport problems were arranged for forest officers on leave from Rhodesia, India and China, and Colonel Lloyd conducted a forestry tour to Northern France which was attended by officers from Australia and India.

Assistance was again given to College Bursars in the extraction and marketing of timber from College woods, and miscellaneous enquiries during the year numbered thirty-six.

Local sawmill and wood-using industries, including the G.W.R. Carriage and Waggon Works at Swindon, were visited for demonstration purposes, and two visits were made to the Forest Products Research Laboratory at Princes Risborough. Special thanks are due to the Director of the Laboratory, the Chief Engineer of the G.W.R. Carriage Works, and the Manager, Forest Products Ltd., for assistance in connection with these visits.

A special study of aerial reconnaissance in relation to the survey, management and utilization of woods was initiated, and Colonel Lloyd visited Canada this year to study Canadian aerial survey methods.

### LIBRARY.

The library has been moved to another room which, although no larger, is more convenient. Advantage was taken of the move to carry out stock-taking so far as time permitted. The inadequacy of space is an acute and increasing problem.

During the year various changes were made in the Library staff. The services of a library clerk were dispensed with. Part of the library duties were devolved upon the Library Superintendent, and at the end of the year the Bibliographer was transferred to work connected with the reclassification of the library according to the Fleury decimal system.

An authors' index to pamphlets, bulletins and other non-book material, a truly 'long-felt want,' was begun, together with a reclassification of such material under the decimal system. Reclassification of books will be done later. In carrying out these changes, the needs of the Imperial Forestry Bureau are considered, and special adaptations made accordingly, that the

library may fulfil one of its most important uses, that of close co-operation with the Bureau.

Books received and catalogued during the year numbered 78; pamphlets and bulletins, 815. The number of current periodicals taken is now 133, one having ceased publication and nine additions having been made since the last Report.

Six new series of bulletins and reports, in addition to those referred to in paragraph 84 of the last Report, are being received, making 676 current.

Borrowings, exclusive of literature consulted in the library, were 2,245; of these, 201 were by readers outside the Department, the chief proportion being by post. Readers in the library numbered 1,025 and visitors 150, as recorded; these figures are an understatement, as owing to pressure of other work the record is incomplete. External enquiries, involving in most instances the preparation of lists of literature on specific subjects, totalled 26; since January 1, 1939, the Bureau has dealt with most of the enquiries received by the Department, so that this figure is not only much smaller than in previous years, but may be expected to disappear from future reports.

The supplying of literature listed in the Current Monthly Record continued; there were twenty orders during the year, with a total of 83 items.

Towards the end of the year it became necessary for financial reasons to suspend work on the Forest Bibliography, and it is very unlikely that, under the present circumstances, it will be possible to complete it.

During the year the library received valuable material from the following donors, to whom grateful acknowledgment is made: Madame Maurice de Bray, Lyons-la-Forêt, Eure, France, and Monsieur Barbier de la Serre, Conservateur des Eaux et Forêts, Rouen, France, for a scarce publication by Mme. de Bray's father, M. de la Bunodière d'Esmalleville; Mijnheer R. J. van Lier, s'Gravenhage, Holland; Monsieur Collardet, Comité National du Bois, Paris; the Professor of Forestry, University of Oxford; Dr. Burt Davy; Mr. T. R. Peace; Mr. Gore-Booth; Dr. L. Chalk; Mr. P. J. Greenway, Amani Agricultural Research Station; Mr. J. N. Oliphant; Dr. H. Bancroft (Mrs. Eyres-Simmons); Mr. H. S. Single; Mr. H. S. Blunt; Mr. I. Kissin; Mr. E. M. Conder; Mrs. L. E. D. Berkeley; Mr. E. C. M. Richards, Westchester, Pennsylvania, U.S.A.; the Empire Forestry Association; the South African Forestry Association; the Director, Forest Products Research Laboratory; the Librarian, School of Rural Economy, Oxford; the Librarian, School of Agriculture, Cambridge; Macaulay Institute of Soil Research, Aberdeen; British Columbia Timber Commis-

sioner, London; Timber Commissioner for Eastern Canada, London; Bureau of Public Roads, Washington, U.S.A.; Division of Silvics, U.S. Forest Service, Washington, U.S.A.

Miss Merchant kindly contributed another 54 hours of voluntary assistance and completed a much-needed index to the maps belonging to the Department; as she has now been appointed librarian to the Delegacy of Extra-Mural Studies in the University, her deeply appreciated help has had to cease.

Exchange relations were entered into with six additional institutions. In future the Bureau will arrange for certain types of exchange material, whereby the library will benefit increasingly.

### DOCUMENTATION SECTION.

The activities of the Documentation Section continued as in the previous year and the publication of the *Current Monthly Record* and the *News Bulletin of Empire Forest Departments* was maintained. As envisaged in the last Report, an Imperial Forestry Bureau has been established in Oxford under the Imperial Agricultural Bureaux. The Documentation Section formed the transitional link pending the appointment of the Deputy Director of the Bureau, which took place in June 1939, using the nucleus organization already set up in 1938, and acting under the supervision of the Director. From January 1st 1939, the Documentation Officer acted as liason officer between the Library of the Institute and the Bureau, being appointed Library Superintendent in the Institute and Documentation Officer in the Bureau, and the Section ceased to exist. This office is of particular importance in that it forms a necessary link between the two institutions. On the one hand the work of the Bureau is of great use to the Institute, and on the other the facilities of the Institute Library and the technical advice of the members of the Institute staff represent an asset of very considerable value to the Bureau.

In addition to the normal editions of the *Current Monthly Record* and the *News Bulletin*, six Institute Papers and one Technical Paper were issued. The titles of these are given in Appendix III.

### FINANCE.

The audited accounts of the Institute will appear as usual in the *Oxford University Gazette*. An analysis of receipts and payments, designed to show the distribution of expenditure among the various sections and activities of the Institute, will be found in Appendix II. The figures in this statement have been approximated to the nearest pound. The year opened with

a balance in hand of £1,021 and closed with a surplus of £873, and actual expenditure, exclusive of these balances, was £10,750 as against £10,480 in the previous year. Total receipts were £10,602 as against £10,762 in the previous year. Grants from the Dominions decreased, as a result of the cessation of the grant from South Africa and the non-receipt of Queensland's contribution. The contributions from the Indian Provinces were also reduced.

Fees were £76; none were received in the previous year.

#### ADMINISTRATION AND GENERAL.

A list of the staff at the close of the year is given in Appendix I. It is regretted that circumstances permitted neither Mr. J. N. Oliphant, who held the post of Director until the end of the year, nor Professor Troup, to write this report.

W. R. DAY,

*Deputy Professor*

(on behalf of the Committee for Forestry).



## APPENDIX I

## LIST OF STAFF.

## I. STAFF ENGAGED IN INSTRUCTION AND RESEARCH.

- \*Professor R. S. TROUP, C.M.G., C.I.E., M.A., D.Sc. (Oxon.), F.R.S., Fellow of St. John's College. Silviculture.  
 J. N. OLIPHANT, M.A. (Oxon.), Christ Church (Director). Tropical Forest Economics and Policy.  
 †J. BURTT DAVY, M.A., D.Phil. (Oxon.), Ph.D. (Cantab.), University College. Forest Botany and Ecology.  
 A. C. HOYLE, B.Sc., M.A. (Oxon.), Pembroke College. Forest Botany and Ecology.  
 †L. CHALK, M.A., D.Phil. (Oxon.), University College. Wood Structure and Properties.  
 Miss M. M. CHATTAWAY, B.Sc., M.A., D.Phil. (Oxon.), St. Hugh's College. Wood Structure and Properties.  
 †W. R. DAY, B.Sc., M.A. (Oxon.), Exeter College. Pathology, Forest Hygiene, Silviculture.  
 †R. N. CHRYSTAL, D.Sc. (Edin.), Hon. M.A. (Oxon.). Forest Zoology.  
 \*†A. H. LLOYD, M.C., M.A. (Oxon.), Exeter College. Forest Engineering and Utilization.

## II. STAFF ENGAGED SOLELY IN RESEARCH FOR THE FORESTRY COMMISSION.

- T. R. PEACE, M.A. (Cantab.). Pathology and Mycology.  
 J. M. B. BROWN, B.Sc. (Belfast). Entomology.  
 R. G. SANZEN-BAKER, B.Sc. (Edin.). *Forestry Commission Research Officer for England and Wales.* Silviculture.

## III. STAFF OF OTHER UNIVERSITY DEPARTMENTS ASSISTING IN INSTRUCTIONAL WORK.

- Professor T. G. B. OSBORN, M.A., Sherardian Professor of Botany, Fellow of Magdalen College. Ecology.  
 C. G. T. MORISON, M.A. (Oxon.), University Reader in Soil Science, Student of Christ Church. Soil Science.  
 G. R. CLARKE, B.Sc., M.A., Lecturer in Soil Science, Department of Rural Economy, Oriel College. Soil Science.  
 H. S. WILLIAMSON, M.A. (Oxon.), Christ Church. Forest Law and Land Tenure.

## IV. DOCUMENTATION SECTION.

- P. S. SPOKES, B.Sc., M.A. (Oxon.), The Queen's College.

## V. OTHER STAFF.

*Secretary*: Miss C. MEMMOTT.

*Librarian*: Miss G. GUINEY.

*Accountant*: F. E. BALMAN.

\* The Institute is responsible for approximately 18 and 52 per cent. respectively of the salaries and contingent superannuation fund contributions of Professor Troup and Mr. Lloyd.

† These members of the staff have the status of University Demonstrators, having been reappointed as such with effect from the following dates: Dr. Burtt Davy, 1.10.33; Mr. Lloyd, 1.10.34; the remainder, 1.10.36.

## APPENDIX II

## IMPERIAL FORESTRY INSTITUTE, 1938-39.

## GENERAL ACCOUNT.

RECEIPTS.		PAYMENTS.	
	£		£
Surplus, August 1st.		Administration ...	2,057
Brought forward ...	1,021.	Botany ...	1,721
Grants from—		Drawing Office ...	193
Forestry Commission :		Engineering ...	358
General ...	2,100	Entomology ...	879
Special ...	1,511	Library ...	324
Colonies ...	5,041	Mycology ...	881
Dominions ...	167	Photographic ...	152
Indian Provinces ...	800	Publications ...	307
Sudan ...	50	Silviculture ...	330
D.S.I.R. ...	133	Tours and Fees ...	285
Sale of Publications ...	187	Wood Structure ...	1,089
Sale of Photographs, Slides, etc. ...	6	Documentation ...	614
Interest on Deposit held by Capital Account ...	531	Forestry Commission :—	
Fees ...	76	Mycology ...	940
		Entomology ...	570
		Repayment of Mortgage, infra ...	50*
			10,750
		Surplus, July 31st, 1938, carried forward :—	
		Accounts re- ceivable ..	£ 210
		Grants due ..	273
		Cash at Bank	627
		Cash on De- posit ...	1,959
			4,155
		Less Grants in advance	3,140
		Accounts owing	142
			3,282
			873
	£11,623		£11,623

## CAPITAL ACCOUNT.

	£		£
Balance, August 1st, 1938.		Balance, July 31st, 1939.	
Brought forward from last account ...	24,581	Carried forward to next account ...	24,631
General Account, <i>supra</i> ...	50*		
	£24,631		£24,631

\*£900 were drawn from Capital Account in 1931-32 to pay off mortgages at 6 Keble Road and 18 Museum Road, and this sum is being repaid from General Account in yearly instalments of £50.

## APPENDIX III

## PUBLICATIONS, 1938-39.

## BY THE STAFF.

- BURTT DAVY, J. Diameter of the Selbourne Yew. *Quarterly Journal of Forestry*, Vol. XXXII, p. 276 (and photo), 1938.
- CHALK, L. Standardization of terms for vessel diameter and ray width. (*Tropical Woods* No. 55, pp. 16-23). I.F.I. Paper No. 16 (see below).
- CHATTAWAY, M. M., and RECORD, S. J. List of anatomical features used in classifying dicotyledonous woods. (*Tropical Woods* No. 57, pp. 11-16).
- DAY, W. R. Local Climate and the Growth of Trees with special reference to Frost. (*Quarterly Journal of the Royal Meteorological Society*, Vol. LXV, No. 280, pp. 195-209, April 1939).
- Root-rot of Sweet Chestnut and Beech caused by Species of *Phytophthora*. I. Cause and Symptoms of Disease: Its relation to Soil Conditions. (*Forestry*, Vol. XII, 2, pp. 101-116, 1938).
- II. Inoculation Experiments and Methods of Control. (*Forestry*, Vol. XIII, 1, pp. 46-58, 1939).
- DUNKLEY, H. L. A multiple entry perforated card-key for the identification of Uganda trees. (*Empire Forestry Journal*, Vol. 18, pp. 83-90, 1939).
- JONES, F. H., and PEACE, T. R. Experiments with Frost Heaving (*Quarterly Journal of Forestry*, No. 2, Vol. XXXIII, pp. 79-89, April 1939).
- PEACE, T. R. I.F.I. Leaflets 1 and 2 (see below).

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 PAPERS COMMUNICATED THROUGH THE IMPERIAL FORESTRY INSTITUTE.

- GRASOVSKY, A. Erosion and desiccation studies in three continents. (*Empire Forestry Journal*, 17, 1938, pp. 203-210).
- STRUGNELL, E. J. Silviculture in Malaya. (*Empire Forestry Journal*, 17, 1938, pp. 188-194).

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 IMPERIAL FORESTRY INSTITUTE PAPERS.

15. DUNDAS, J. Vegetation types of the Colonie du Niger. 1938. 3s. 6d.

16. CHALK, L. A forestry tour in 1937. 1939. 2s. 6d.
  17. MOOR, H. W. The influence of vegetation on climate in West Africa, with particular reference to the protective aspects of forestry in the Gold Coast. 1939. 1s.
  18. DALE, I. R. The woody vegetation of the Coast Province of Kenya, 1939. 2s.
  19. RICHARDS, P., TANSLEY, A. G., and WATT, A. S. The recording of structure, life-form and flora of tropical forest communities as a basis for their classification, 1939. 1s.
  20. SMITH, J., and PETRIE, A. M. Native Housing in Relation to Forestry in the Anglo-Egyptian Sudan with details of types of houses for which local sawn timber output has been standardized, 1939. 2s.
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#### CHECK-LISTS OF THE FOREST TREES AND SHRUBS OF THE BRITISH EMPIRE.

4. Draft of first descriptive check-list for Ceylon. Compiled by L. A. J. Abeyesundere and R. A. de Rosayro. Edited by A. C. Hoyle.
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#### FOREST TREES AND TIMBERS OF THE BRITISH EMPIRE.

4. EGGELING, W. J., and HARRIS, C. M. Fifteen Uganda Timbers. Edited by L. Chalk, J. Burt Davy and A. C. Hoyle. (Includes Index to Vols. I-IV).
- 

#### IMPERIAL FORESTRY INSTITUTE LEAFLETS.

1. PEACE, T. R. The resistance of Poplars to canker and other diseases. (Mimeographed).
2. PEACE, T. R. The resistance of Elms to the disease caused by *Ophiostoma (Ceratostomella) ulmi*. (Mimeographed).



## APPENDIX IV

## BOTANICAL IDENTIFICATIONS, 1938-39.

Bechuanaland Protectorate	...	...	...	64
Gold Coast	...	...	...	47
Kenya Colony	...	...	...	6
Nigeria	...	...	...	27
Nyasaland	...	...	...	168
Northern Rhodesia	...	...	...	140
Southern Rhodesia	...	...	...	148
St. Helena	...	...	...	40
South Africa	...	...	...	130
Swaziland	...	...	...	127
Sudan	...	...	...	220
Tanganyika Territory	...	...	...	200
Uganda	...	...	...	6
Trinidad	...	...	...	2
Forest Products Research Laboratory, Princes Risborough	...	...	...	127
Imperial Forestry Institute Staff and various correspondents	...	...	...	268
				<hr/> 1,720 <hr/>

## APPENDIX V

## SPECIMENS RECEIVED, 1938-39.

## HERBARIUM.

EUROPE. *The British Isles*: Various correspondents, 177; the Forest Products Research Laboratory, Princes Risborough, 115; Dr. H. H. Bancroft, 1; Dr. J. Burt Davy, 12; Mr. D. Young, 13. *Germany*: Dr. H. Sleumer, 32.

ASIA. *Asia Minor*: Dr. A. Rehder, Arnold Arboretum, Jamaica Plain, Massachusetts, U.S.A., 7. *Palestine*: The Conservator of Forests, Jerusalem, 31. *Straits Settlements*: The Director, Royal Botanic Gardens, Singapore, 175.

AFRICA. *Belgian Congo*: Prof. Dr. W. Robyns, Jardin Botanique de l'Etat, Bruxelles, 124. *Gold Coast*: The Conservator of Forests, Accra, through Mr. J. E. Andoh, 58; Mr. F. E. Hughes, 38; Dr. Seth-Smith, 11; Mr. J. R. Cosgrove, Colonial Forest Resources Development Department, 3. *Kenya Colony*: The Conservator of Forests, Nairobi, 64; The Director, Royal Botanic Gardens, Kew, 2; Mr. B. J. Rendle, Forest Products Research Laboratory, Princes Risborough, 12. *Mauritius*: Mr. H. C. King, 91. *Nigeria*: Mr. J. Dundas, 2; Mr. W. A. Fairbairn, 2; Mr. J. H. Mackay, 2. *Nyasaland*: Sir H. Kittermaster, through the Conservator of Forests, Zomba, 1; Mr. W. E. Lewis, 59; Mr. R. G. M. Willan, 2; Mr. P. Topham, 1. *Northern Rhodesia*: Mr. J. D. Martin, 103; Mr. R. G. Miller, 223. *Southern Rhodesia*: The Conservator of Forests, Salisbury, 198. *Sudan*: Mr. A. C. Hoyle, 1,660. *Swaziland*: Mr. O. B. Miller, 31. *Tanganyika Territory*: The Conservator of Forests, Morogoro, 161; Mr. P. J. Greenway, 202; The Director, Royal Botanic Gardens, Kew, 6. *Uganda*: The Conservator of Forests, Entebbe, through Mr. W. J. Eggeling, 53.

AMERICA. *British Guiana*: The Conservator of Forests, Georgetown, 346. *United States*: Mr. T. R. Peace, 61; The Arnold Arboretum, Harvard University, 43; New York State College of Forestry at Syracuse University, 132; School of Forestry, Yale University, 120.

TOTAL: 4,374.

## WOOD COLLECTION.

## Hand Specimens for Type Collection.

EUROPE. *The British Isles*: Royal Botanic Gardens, Kew, 7; Forest Products Research Laboratory, Princes Risborough,

3; Dr. J. Burt Davy, 4; Dr. L. Chalk, 5; Dr. E. W. Jones, 1; Prof. R. S. Troup, 1. *France*: Dr. D. Normand, 1.

ASIA. *China*: Dr. Y. Tang, 154. *Malaya*: Mr. H. E. Desch, 8.

AFRICA. *Uganda*: Conservator of Forests, 17. *Nyasaland*: Mr. W. E. Lewis, 1.

INDIA. *Via* the Forest Products Research Laboratory, Princes Risborough, 1.

AMERICA. *U.S.A.*: Mr. W. J. Field, 14; Prof. S. J. Record, 5. *Cayman Islands*: Mr. C. D. Lewis, 13.

AUSTRALIA: *Via* Forest Products Research Laboratory, Princes Risborough, 1; Mr. H. E. Dadswell, 7; Mr. M. B. Welch, 45.

TOTAL: 290.

## APPENDIX VI

## HERBARIUM EXCHANGES, 1938-39.

	Duplicates Despatched.	Duplicates Received.
Arnold Arboretum (Dr. A. Rehder) ...	85	50
British Museum (Dr. J. Ramsbottom) ...	135	—
Jardin Botanique de l'Etat, Brussels (Prof. Dr. W. Robyns) ... ..	110	124
Botanisches Museum, Berlin-Dahlem (Dr. R. Pilger) ... ..	125	32
Berliner-botanischer Tauschverein Forst (Otto Behr) ... ..	150	—
Kew, Royal Botanic Gardens (Sir Arthur W. Hill) ... ..	111	8
New York Botanical Garden, Bronx Park (W. J. Robbins) ... ..	25	—
New York State College of Forestry, at Syracuse University (Prof. H. P. Brown)	—	132
Botanic Gardens, Singapore (Mr. R. E. Holtum) ... ..	—	175
Yale University, School of Forestry (Prof. S. J. Record) ... ..	85	—
	<hr/> 826	<hr/> 531



PUBLICATIONS ISSUED BY THE IMPERIAL  
FORESTRY INSTITUTE.

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OXFORD FORESTRY MEMOIRS.

1. The Relation between Height Growth of Trees and Meteorological Conditions. By W. E. Hiley and Norman Cunliffe. 1922. 3s. 6d.
2. Soil Acidity and its Relation to the Production of Nitrate and Ammonia in Woodland Soils. By G. R. Clarke. 1924. 3s. 6d.
3. The Watermark Disease of the Cricket-bat Willow (*Salix caerulea*). By W. R. Day. 1924. 3s. 6d.
4. Measurements of the Cubical Contents of Forest Crops. By M. D. Chaturvedi. 1926. 10s. 6d.
5. The Physiography of Southern Nigeria and its Effect on the Forest Flora of the Country. By J. R. Ainslie. 1926. 4s. 0d.
6. The Financial Return from the Cultivation of Scots and Corsican Pines. By W. E. Hiley. 1926. 3s. 6d.
7. The Gold Coast Forest: A Study in Synecology. By T. F. Chipp. 1927. 10s. 0d.
8. The Forest Industry of Finland. By W. E. Hiley. 1928. 4s. 6d.
9. Aerial Survey in Relation to the economic Development of new Countries, with special Reference to an Investigation carried out in Northern Rhodesia. By R. Bourne. 1928. 7s. 6d.
10. Formation of Spring and Summer Wood in Ash and Douglas Fir. By L. Chalk. 1930. 6s. 0d.
11. Studies of the Sirex Parasites. By R. N. Chrystal. 1930. 5s. 0d.
12. The Plasticity of the Root System of Corsican Pine in early Life: Researches designed to facilitate the Establishment of this Tree in Great Britain. By R. N. Aldrich-Blake. 1930. 6s. 0d.

13. Regional Survey and its Relation to Stocktaking of the Agricultural and Forest Resources of the British Empire. By R. Bourne. 1931. 15s. *od.*
14. The Fixation of atmospheric Nitrogen by Bacteria living symbiotically in Root Nodules of *Casuarina equisetifolia*. By R. N. Aldrich-Blake. 1932. 3s. 6*d.*
15. *Meria laricis*, the Leaf-Cast Disease of Larch. By T. R. Peace and C. H. Holmes. 1933. 4s. *od.*
16. The Experimental Production and the Diagnosis of Frost Injury on Forest Trees. By W. R. Day and T. R. Peace. 1934. 6s. *od.*
17. The Physiography and Vegetation of Trinidad and Tobago. A Study in Plant Ecology. By R. C. Marshall. 1934. 6s. *od.*
18. The Silviculture of the Mixed Deciduous Forests of Nigeria. By W. D. MacGregor. 1934. 15s. *od.*
19. The Use and Misuse of Land. By R. MacLagan Gorrie. 1935. 6s.

#### OXFORD MANUALS OF FORESTRY.

Silvicultural Systems. By R. S. Troup. 1928. 21s.

The Economics of Forestry. By W. E. Hiley. 1930. 21s.

#### FOREST TREES AND TIMBERS OF THE BRITISH EMPIRE.

1. Some East African Coniferae and Leguminosae. By L. Chalk, J. Burt Davy and H. E. Desch. 1931. 5s.
2. Twenty West African Timber Trees. By L. Chalk, J. Burt Davy, H. E. Desch and A. C. Hoyle. 1933. 7s. 6*d.*
3. Fifteen South African High Forest Timber Trees. By J. Burt Davy, L. Chalk, M. M. Chattaway, F. S. Laughton and M. H. Scott. 1935. 7s. 6*d.*
4. Fifteen Uganda Timbers. By W. J. Eggeling and C. M. Harris. Edited by L. Chalk, J. Burt Davy and A. C. Hoyle. (Includes Index to Vols. I-IV). 1939. 7s. 6*d.*

#### CHECK-LISTS OF THE FOREST TREES AND TIMBERS OF THE BRITISH EMPIRE.

1. Uganda Protectorate. By J. Burt Davy and F. Bolton, with the collaboration of N. V. Brasnett, W. J. Eggeling and C. M. Harris. 1935. 5s.

2. Nyasaland Protectorate. By J. Burt Davy, J. B. Clements, P. Topham and R. C. Ross Townsend. 1936. (*Out of print.*)
3. Draft of the First Descriptive Check-List of the Gold Coast. Compiled by Members of the Gold Coast Forest Department and revised by the Staff of the Imperial Forestry Institute herbarium. 1937. 5s. (*Out of print.*)
4. Draft of the First Descriptive Check-list for Ceylon. Compiled by L. A. J. Abeyesundere and R. A. de Rosayro. Edited by A. C. Hoyle. 1939. 7s. 6d.

#### MISCELLANEOUS.

- The Silviculture of Indian Trees. By R. S. Troup. 1921. 3 volumes. 105s.
- A Manual of the Flowering Plants and Ferns of the Transvaal, with Swaziland, South Africa. By J. Burt Davy. Part I, 1926. 15s. Part II, 1932. 25s.
- Handbook of Conifers grown in the Arboretum, Bagley Wood, Oxford. By J. Burt Davy. 1926. 2s.
- Collection and Preparation of Herbarium and Timber Specimens. By J. Burt Davy and L. Chalk. 1928. 8d.
- Engineering for Forest Rangers in Tropical Countries, with special reference to Burma. By A. H. Lloyd. 1929. 17s. 6d.
- British Hardwoods: their Structure and Identification. By L. Chalk and B. J. Rendle. 1929. (Issued by the Forest Products Research Laboratory, Princes Risborough, as Forest Products Research Bulletin No. 3). 5s.
- Exotic Forest Trees in the British Empire. By R. S. Troup. 1932. 20s.
- Natural Woodlands of Britain and Ireland. By M. L. Anderson. 1932. 9d.
- International Classification System for Forest Bibliography with the Index Number 634.9F. International Union of Forest Research Organizations. English translation. 1936. 6s.
- Forest Bibliography to 31st December, 1933. Part I (1, General Silviculture, and 2, Seed and Seedlings). 1936. 5s. Part II (3, Natural Reproduction; 4, Artificial Reproduction; 5, Tending; 6, Silvicultural Systems; 7, Notes on Trees). 1937. 12s. 6d. Part III (Forest Protection: 1, Man; 2, Animals; 3, Atmospheric Influences; 4, Fire; 5, Weeds; 6, Other Agencies; 7, Fencing). 1938. 12s. 6d.

The Study of the Soil in the Field. By G. R. Clarke. Second edition. 1938. Clarendon Press, 6s.

Insects of the British Woodlands. By R. N. Chrystal. 1937. 7s. 6d. Warne.

The Black Poplars and their Hybrids cultivated in Britain. By G. S. Cansdale and members of the staff of the Imperial Forestry Institute. 1938. 3s. 6d.

Forestry and State Control. By R. S. Troup. 1938. 3s. 6d. Clarendon Press.

Colonial Forest Administration. By R. S. Troup. 1940. 2 volumes. 30s. Ready shortly.









